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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/808,796 | 03/15/2001 | Karl Beeson | 30-3818 DIV-2 (4370) | 6658 |

7590 12/01/2004

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| EXAMINER | |
|---|---|
| LUK, EMMANUEL S | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1722 | |

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/808,796 | BEESON ET AL. | |
| | Examiner | Art Unit | |
| | Emmanuel S. Luk | 1722 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *20 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *22-33,35-38,42 and 57-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-33,35-38,42 and 57-67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 22-30, 35, 36 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al in view of Rendulic et al and Beeson et al (5396350).

Takahashi teaches a transparent plate (1), such as a glass plate (col. 15, lines 27), a liquid photosensitive resin composition is placed on the substrate (Col. 15, lines 31), a transparent substrate (5) is placed, and a light source (7) is applied to cure a portion of the resin (Col. 16, lines 15-22), the uncured portion is removed via nozzle washing or brush washing using a wash-out solution (Col. 16, lines 28-31). Takahashi also teaches types of resins that can be used including oligomers, monomers, polymers (Col. 4 to Col. 14), and photoinitiators (Col. 3, line 20).

The glass plate is also the amorphous inorganic substrate that the resin rests upon.

Takahashi fails to teach a collimated light source and angle of divergence not more than 10 degrees and the light provides more than one dose and an array of optical wave guides with lenticular elements juxtaposed with polymerizable materials.

Rendulic teaches an apparatus for producing printed circuit boards wherein polymers are coated onto a board and a light is applied for curing the polymer. The light source providing collimated light (Col. 7, line 4) with an angle of deviation not more than 3 degrees and preferably not more than 1.5 degrees (Col. 7, lines 6-10). Rendulic also teaches the use of light guidance via cabinet with mirrors to change the path of the light (Col. 8, lines 26-35) and one skilled in the art would recognize the cabinet as a waveguide for directing the light.

In regards to the dose, the light can be increased to provide more than one dose, this is an intended use of light source in the apparatus.

It would have been obvious to one of ordinary skill in the art to modify Takahashi with the collimated light and angle of divergence not more than 10 degrees as taught by Rendulic because it provides uniformity and accuracy.

Beeson teaches a waveguide comprising of an array of microprisms that transmit light rays via reflection (Col. 2, lines 34-42), "the reflecting means provide and energy efficient, bright and uniform distribution of light that is provided in a low profile assembly" (Col. 2, lines 25-28). It would have been obvious to one of ordinary skill in the art to modify Rendulic with the waveguide in place of the cabinet for directing the light towards the desired location for curing. The positioning for the optical waveguide in relation to the substrates would have been obvious to one skilled in the art to have it juxtaposed in order for the waveguide to function.

It would have been obvious to one of ordinary skill in the art to modify Takahashi with an optical waveguide as taught by Beeson because it allows for improved transmission of radiation for curing on the polymerizable layer.

In regards to the waveguide positioned between the substrate and the means for directing light, this is inherent since the waveguide is to direct the light from the means for directing light to the substrate.

3. Claims 57-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al in view of Rendulic et al and Beeson et al (5396350).

Takahashi teaches a transparent plate (1), such as a glass plate (col. 15, lines 27), a liquid photosensitive resin composition is placed on the substrate (Col. 15, lines 31), a transparent substrate (5) is placed, and a light source (7) is applied to cure a portion of the resin (Col. 16, lines 15-22), the uncured portion is removed via nozzle washing or brush washing using a wash-out solution (Col. 16, lines 28-31). Takahashi also teaches types of resins that can be used including oligomers, monomers, polymers (Col. 4 to Col. 14), and photoinitiators (Col. 3, line 20).

The glass plate is also the amorphous inorganic substrate that the resin rests upon.

Takahashi fails to teach a collimated light source and angle of divergence not more than 10 degrees and the light provides more than one dose and an array of optical wave guides with lenticular elements juxtaposed with polymerizable materials.

Rendulic teaches an apparatus for producing printed circuit boards wherein polymers are coated onto a board and a light is applied for curing the polymer. The light source providing collimated light (Col. 7, line 4) with an angle of deviation not more than 3 degrees and preferably not more than 1.5 degrees (Col. 7, lines 6-10). Rendulic also teaches the use of light guidance via cabinet with mirrors to change the path of the light (Col. 8, lines 26-35) and one skilled in the art would recognize the cabinet as a waveguide for directing the light.

In regards to the dose, the light can be increased to provide more than one dose, this is an intended use of light source in the apparatus.

Beeson teaches a waveguide comprising of an array of microprisms that transmit light rays via reflection (Col. 2, lines 34-42), "the reflecting means provide and energy efficient, bright and uniform distribution of light that is provided in a low profile assembly" (Col. 2, lines 25-28). It would have been obvious to one of ordinary skill in the art to modify Rendulic with the waveguide in place of the cabinet for directing the light towards the desired location for curing. The positioning for the optical waveguide in relation to the substrates would have been obvious to one skilled in the art to have it juxtaposed in order for the waveguide to function.

The positioning for the optical waveguide in relation to the substrates would have been obvious to one skilled in the art to have it juxtaposed in order for the waveguide to function.

It would have been obvious to one of ordinary skill in the art to modify Takahashi with the collimated light and angle of divergence not more than 10 degrees as taught by

Rendulic because it provides uniformity and accuracy and an optical waveguide as taught by Beeson because it allows for improved transmission of radiation for curing on the polymerizable layer.

In regards to the waveguide positioned between the substrate and the means for directing light, this is inherent since the waveguide is to direct the light from the means for directing light to the substrate.

4. Claim 67 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi in view of Rendulic and Beeson et al (5396350) as applied to claim 57-63 above, and further in view of Jarsen (4415138).

Takahashi, as modified by Rendulic and Beeson et al, fails to teach smooth bumps 1-20 μm on the surface.

Jarsen teaches a mold for creating bumps in the resin prior to curing. In regards to the shape of surface being smooth bumps between 1-20 μm, Jarsen teaches the shape to be formed as bumps having a depth of 0.7 μm and 2 μm in radial direction. It would have been obvious to one of ordinary skill in the art to modify Jarsen to merely change the size of the depth thus allowing for the desire bump size in the surface of the product.

It would have been obvious to one of ordinary skill in the art to modify Takahashi to produce a surface as taught by Jarsen because it allows for the desired shape and depth on the surface of the resin layer.

5. Claim 64 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al in view of Rendulic et al and Jarsen (4415138)

Takahashi teaches a transparent plate (1), such as a glass plate (col. 15, lines 27), a liquid photosensitive resin composition is placed on the substrate (Col. 15, lines 31), a transparent substrate (5) is placed, and a light source (7) is applied to cure a portion of the resin (Col. 16, lines 15-22), the uncured portion is removed via nozzle washing or brush washing using a wash-out solution (Col. 16, lines 28-31). Takahashi also teaches types of resins that can be used including oligomers, monomers, polymers (Col. 4 to Col. 14), and photoinitiators (Col. 3, line 20).

The glass plate is also the amorphous inorganic substrate that the resin rests upon.

Takahashi fails to teach a collimated light source and metal layer and a smooth bumps 1-20 μm on the surface.

Rendulic teaches an apparatus for producing printed circuit boards wherein polymers are coated onto a board and a light is applied for curing the polymer. The light source providing collimated light (Col. 7, line 4) with an angle of deviation not more than 3 degrees and preferably not more than 1.5 degrees (Col. 7, lines 6-10). Rendulic also teaches the use of light guidance via cabinet with mirrors to change the path of the light (Col. 8, lines 26-35) and one skilled in the art would recognize the cabinet as a waveguide for directing the light.

Jarsen teaches a mold for creating bumps in the resin prior to curing. In regards to the shape of surface being smooth bumps between 1-20 μm, Jarsen teaches the

shape to be formed as bumps having a depth of 0.7 μm and 2 μm in radial direction. It would have been obvious to one of ordinary skill in the art to modify Jarsen to merely change the size of the depth thus allowing for the desire bump size in the surface of the product.

It would have been obvious to one of ordinary skill in the art to modify Takahashi with the collimated light as taught by Rendulic because it provides uniformity and accuracy and to produce a surface as taught by Jarsen because it allows for the desired shape and depth on the surface of the resin layer.

6. Claims 22-30, 35, 36 and 42 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumura et al in view of Rendulic et al and Beeson et al (5396350).

Matusumura et al teaches a glass substrate (1), a transparent electroconductive layer (2), containing tin oxide, indium oxide and the like (Col. 2, lines 7-9), a photosensitive layer (3), a mask (4), the resin comprising of polymer resins, exposure of a light source for curing (Col. 4, lines 38-40) and the substrate is washed rinsed in water to remove the resin (Col. 4, lines 50-53).

Matsumura fails to teach a collimated light source and angle of divergence not more than 10 degrees and the light provides more than one dose and an array of optical wave guides with lenticular elements juxtaposed with polymerizable materials.

Rendulic teaches an apparatus for producing printed circuit boards wherein polymers are coated onto a board and a light is applied for curing the polymer. The light

source providing collimated light (Col. 7, line 4) with an angle of deviation not more than 3 degrees and preferably not more than 1.5 degrees (Col. 7, lines 6-10). Rendulic also teaches the use of light guidance via cabinet with mirrors to change the path of the light (Col. 8, lines 26-35) and one skilled in the art would recognize the cabinet as a waveguide for directing the light.

In regards to the dose, the light can be increased to provide more than one dose, this is an intended use of light source in the apparatus.

Beeson teaches a waveguide comprising of an array of microprisms that transmit light rays via reflection (Col. 2, lines 34-42), "the reflecting means provide and energy efficient, bright and uniform distribution of light that is provided in a low profile assembly" (Col. 2, lines 25-28). It would have been obvious to one of ordinary skill in the art to modify Rendulic with the waveguide in place of the cabinet for directing the light towards the desired location for curing. The positioning for the optical waveguide in relation to the substrates would have been obvious to one skilled in the art to have it juxtaposed in order for the waveguide to function. The positioning for the optical waveguide in relation to the substrates would have been obvious to one skilled in the art to have it juxtaposed in order for the waveguide to function.

It would have been obvious to one of ordinary skill in the art to modify Matsumura with the collimated light and angle of divergence not more than 10 degrees as taught by Rendulic because it provides uniformity and accuracy and an optical waveguide as taught by Beeson because it allows for improved transmission of radiation for curing on the polymerizable layer.

In regards to the waveguide positioned between the substrate and the means for directing light, this is inherent since the waveguide is to direct the light from the means for directing light to the substrate.

7. Claim 66 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumara in view of Rendulic et al and Beeson et al (5396350) as applied to claim 42 above, and further in view of Jarsen (4415138).

Matsumara fails to teach a smooth bumps 1-20 μm on the surface.

Jarsen teaches a mold for creating bumps in the resin prior to curing. In regards to the shape of surface being smooth bumps between 1-20 μm, Jarsen teaches the shape to be formed as bumps having a depth of 0.7 μm and 2 μm in radial direction. It would have been obvious to one of ordinary skill in the art to modify Jarsen to merely change the size of the depth thus allowing for the desire bump size in the surface of the product.

It would have been obvious to one of ordinary skill in the art to modify Matsumara to produce a surface as taught by Jarsen because it allows for the desired shape and depth on the surface of the resin layer.

8. Claims 31-33, 37-41 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumura in view of Rendulic as applied to claims 22-30, 35, 36 and 42 above, and further in view of Jarsen (4415138) and Beeson et al (5396350).

Matsumura teaches the claimed apparatus as shown above.

Matsumura fails to teach a metallic layer for embossing, light scattering particles in the embossable material and an array of optical wave guides with lenticular elements juxtaposed with polymerizable materials.

Beeson teaches a waveguide comprising of an array of microprisms that transmit light rays via reflection (Col. 2, lines 34-42), "the reflecting means provide and energy efficient, bright and uniform distribution of light that is provided in a low profile assembly" (Col. 2, lines 25-28). It would have been obvious to one of ordinary skill in the art to modify Rendulic with the waveguide in place of the cabinet for directing the light towards the desired location for curing. The positioning for the optical waveguide in relation to the substrates would have been obvious to one skilled in the art to have it juxtaposed in order for the waveguide to function. The positioning for the optical waveguide in relation to the substrates would have been obvious to one skilled in the art to have it juxtaposed in order for the waveguide to function.

Jarsen teaches a mold for creating bumps in the resin prior to curing. In regards to the shape of surface being smooth bumps between 1-20 μm, Jarsen teaches the shape to be formed as bumps having a depth of 0.7 μm and 2 μm in radial direction. It would have been obvious to one of ordinary skill in the art to modify Jarsen to merely change the size of the depth thus allowing for the desire bump size in the surface of the product.

It would have been obvious to one of ordinary skill in the art to modify Takahashi with an optical waveguide as taught by Beeson because it allows for improved transmission of radiation for curing on the polymerizable layer and to produce a surface

as taught by Jarsen because it allows for the desired shape and depth on the surface of the resin layer.

### *Response to Arguments*

9. Applicant's arguments filed 9/20/04 have been fully considered but they are not persuasive. The applicants argue concerning the combination of Takahashi, Rendulic and Beeson. However, Rendulic teaches the use of a waveguide for directing the light from one direction to another via the cabinet with mirrors (Col. 8, lines 26-35). This is related to the waveguide taught by Beeson. Thus, one of ordinary skill in the art would recognize how the technology in Beeson is related to Rendulic and Takahashi.

In regards to the applicant's argument concerning the range in height. The claims concern a requirement of 1-20 microns while the prior art, Jarsen, discusses 1 micron in width. There is an overlap in the ranges and thus it would be obvious to one of ordinary skill in the art to recognize the dimensions of Jarsen is applicable since there is an overlap.

The applicant's argument concerning Matsumura and Rendulic and Takahashi is noted. However, Matsumura is related in the same field as Rendulic and Takahashi in that a resin layer is cured in a pattern by light source.

### *Conclusion*

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel S. Luk whose telephone number is (571) 272-1134. The examiner can normally be reached on Monday-Thursday 7 to 4 and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ben Utech can be reached on (571) 272-1137. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EL

ROBERT DAVIS
PRIMARY EXAMINER
GROUP ~~1300~~ 1700

11/24/04